

Appendix A: Remedial Action Plan (RAP) Summaries

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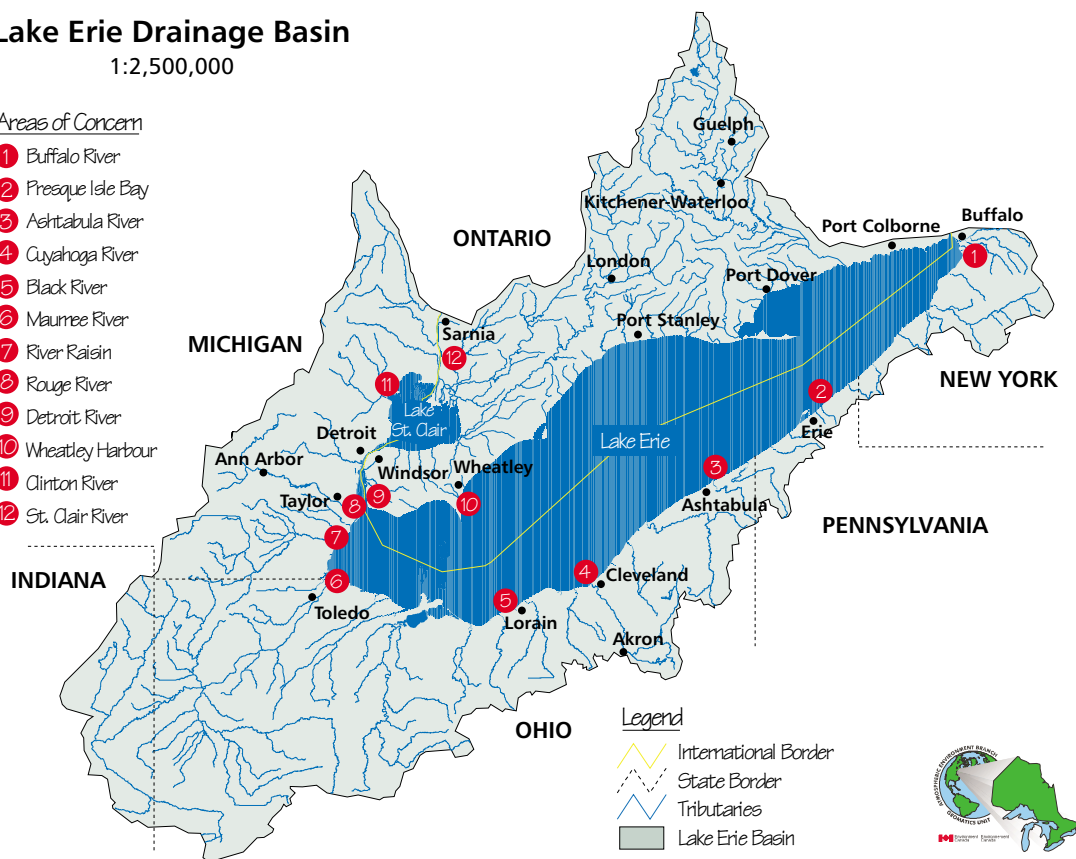
Figure A-1. Map of Areas of Concern around the Lake Erie Basin.

Lake Erie Drainage Basin

1:2,500,000

Areas of Concern

- 1 Buffalo River
- 2 Presque Isle Bay
- 3 Ashtabula River
- 4 Cuyahoga River
- 5 Black River
- 6 Maumee River
- 7 River Raisin
- 8 Rouge River
- 9 Detroit River
- 10 Wheatley Harbour
- 11 Clinton River
- 12 St. Clair River



Appendix A

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Buffalo River Remedial Action Plan

History

The Buffalo River Area of Concern (AOC) is located in the City of Buffalo in western New York. The river empties into the far eastern end of Lake Erie and most of its flow moves directly into the Niagara River. Technically, it is considered a source to Lake Ontario rather than to Lake Erie. The AOC extends from the mouth of the Buffalo River upstream approximately 10 km. There are three major streams in the watershed that feed the Buffalo River: Cayuga Creek, Buffalo Creek and Cazenovia Creek.

The RAP process identified five of 14 beneficial uses as impaired including: restrictions on fish and wildlife consumption; fish tumors or other deformities; degradation of benthos; restrictions on dredging activities; and loss of fish and wildlife habitat. The Buffalo River and its sediments have been impaired by past industrial and municipal discharges and disposal of waste. The known causes of use impairments are chemical contamination and physical disturbances to the river bottom and shoreline. Sources of contaminants include: sediments, inactive hazardous waste sites, combined sewer overflows (CSOs), and other point and nonpoint sources in the watershed. Fish consumption, fish and wildlife populations, and habitat within the AOC have been

impaired by PCBs, chlordane and PAHs. Navigational dredging of the river and bulkheading, along with other alterations of the shoreline, also contributed to these impairments. In addition, metals and cyanides in the sediment prevent open lake disposal of sediments dredged from the river. Use of the river shoreline by industrial development continues to be important although some river bank areas can be seen in various stages of abandonment.

Project Milestones

- 1987: Buffalo River Citizens' Committee (BRCC) and its work groups established.
- 1989: Remedial Action Plan published (Combined Stage 1 and Stage 2).
- 1990: Remedial Action Committee (RAC) formed for RAP implementation.
- 1993: RAP Annual Report update.
- 1995: RAP Status Report update.
- 1999: RAP Status Report update.

Projects Underway

Within the AOC and its watershed a number of studies, assessments and remedial measures will continue to be priorities. These include fish and wildlife consumption restrictions, habitat evaluation and improvements, sediment and water quality investigations and remedial decisions, inactive waste site remediation, and contaminant track down. Three habitat improvement projects have been constructed to address habitat impairments with funding provided through U.S. EPA. Erie County developed habitat project plans in cooperation with the City of Buffalo, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, and NYSDEC. These habitat projects were recently completed. The Buffalo Sewer Authority has received Bond Act funding to address combined sewer overflows.

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Gaps and "To Be Done"

Ongoing assessment activities include the evaluation of remedial options through the modeling of scour and deposition characteristics. Needs include further sampling, treatment assessment, and sediment criteria guidance development to assist the decision making process in addressing contaminated sediments.

Presque Isle Bay Remedial Action Plan

History

Presque Isle Bay is located in the northwestern corner of Pennsylvania on the southern shore of Lake Erie. The primary tributaries are Mill Creek (including Garrison Run) and Cascade Creek, which together account for about two-thirds of the water flowing into the bay.

The RAP process identified two of 14 beneficial uses as impaired including restrictions on dredging and fish tumors or other deformities. Most of the watershed comprises urban and industrial areas within the City of Erie and Millcreek Township. The land use within the Presque Isle Bay watershed is approximately 80% urban. Being a relatively closed system with a flushing time of almost 2.5 years, the bay has suffered from the accumulation and degradation of wastes discharged by point and nonpoint sources. The impairments identified are directly related and have been linked to elevated levels of nitrosamines and Polycyclic Aromatic Hydrocarbons (PAHs) in the sediments. The naturally forming nitrosamines appear to be highly variable, not only by season but also by location within the bay. Most of the PAHs in the sediments are of pyrogenic origin (incomplete combustion of organic matter, generally fossil fuels). The pyrogenic PAHs are derived from deposition of airborne particulate from various combustion sources, runoff from roadways via combined sewer overflows (CSOs) and from various historic and current industrial practices.

Project Milestones

- 1991: Presque Isle Bay was designated as the 43rd Great Lakes Area of Concern (AOC) by the U.S. Department of State. An Ecosystem Study and Background Report was issued.
- 1993: Stage 1 Remedial Action Plan (RAP) was submitted to the International Joint Commission (IJC).
- 1995: RAP Update submitted to International Joint Commission
- 1997: Battelle Sediment Study was completed recommending that, once source control measures are implemented, the sediment management strategy should be natural recovery.

Projects Underway

Stage 2 of the Presque Isle Bay RAP is tentatively scheduled for 2000. This document will detail the remedial and regulatory measures - as determined by the Public Advisory Committee - which will restore beneficial uses in the Bay.

Investigations to date indicate nonpoint source pollution to be the largest contributor of contaminants to Presque Isle Bay. The City of Erie has entered into a Consent Decree with PADEP to spend an estimated \$90 million to upgrade and double the capacity of the WWTP, construct a four million gallon overflow retention facility, and eliminate the remaining 42 CSOs in the city's system.

Projects Pending

The Battelle sediment management strategy has been presented to the PAC and is currently under consideration. The final decision will be based on defensible scientific analysis in conjunction with community based economic and social considerations. This sediment management decision appears to be the most viable, both environmentally and economically, in areas such as Presque Isle Bay which are characterized by widespread, low-levels of contamination with no known hot spots.

Appendix A

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Ashtabula River Remedial Action Plan

"The goal of the Ashtabula River Partnership is to look beyond traditional approaches to determine a comprehensive solution for the impairment of beneficial uses posed by the contaminated sediments in the Ashtabula River and Harbor not suitable for open lake disposal."

History

The Ashtabula RAP process began in 1988 with the establishment of the Ashtabula River RAP Advisory Council. Years of unregulated discharge and mismanagement of hazardous wastes along the river and Fields Brook (now a superfund site) seriously contaminated sediments and degraded biological communities. The lower two miles of the river encompass the area of concern. The 1991 Stage 1 Report documented at least six of 14 beneficial uses impaired, all related to contaminated sediments. Both the commercial and recreational uses of the river were in danger of being shut down because there was no disposal site for contaminated sediments if they were dredged. An interim dredging project in 1993 removed several feet of relatively uncontaminated surface sediments to keep the recreational harbor open.

The Ashtabula River Partnership (ARP) was created in 1994 as a comprehensive, structured, concentrated effort to get the river dredged, and as an alternative to the impending designation of the river as an extension of the Fields Brook superfund site. An oversight coordinating committee was established as well as several technical committees, and a local coordinator was hired. The nonprofit Ashtabula River Foundation was incorporated in 1997 to manage financing for the river cleanup.

Since 1990, extensive sediment characterization studies have been implemented, including: mapping of pollutant concentrations (particularly PCBs); estimation of

sediment volume to be removed; delineation of PAH distribution; TCLP testing to ensure sediments did not qualify as hazardous waste; screening for low level radioactive waste; modeling sediment transport, scouring and deposition rates. A creative mix of funding from local partners, U.S. EPA, USACE, GLNPO and Ohio EPA provided seed funding for initial ARP formation, preliminary comprehensive management plan and environmental impact statement preparation (CMP/EIS), preliminary engineering design and location of the disposal facility, and the aforementioned studies. Extensive reviews of all agencies' authorities were conducted to determine the critical decision points and whose responsibility they would be. Extensive internal communication and cross program coordination has been employed.

Projects Underway

- Review and respond to draft CMP/EIS comments. Public meeting held 9/99 generated overwhelmingly positive response from the community.
- Reviewing analytical results of PAH and low level radionuclide testing, mapping and determining if they pose any additional requirements for disposal.
- Evaluating landfill design and operation, alternative dredging scenarios, dewatering treatment and environmental monitoring components associated with dredging.
- Extensive and up-to-date public education and outreach concerning remedial actions.
- Negotiations with Potentially Responsible Parties (PRPs) concerning potential Natural Resource Damage Assessment (NRDA) actions.
- Review of habitat restoration projects associated with any NRDA actions.
- Investigation of various funding mechanisms to finance remediation.

Projects Pending

- Recommendations on landfill design, dredging scenario, dewatering and monitoring.
- Determination of all permits and certifications needed.
- Determination of final disposal site location and any mitigation requirements.
- Completion of final CMP/EIS in spring 2000.

Gaps and "To Be Done"

- Local sponsor to sign Project Engineering Design Agreement.
- Final decision on cleanup and disposal option and who pays for what.
- Execute Project Cooperative Agreement, line up nonfederal funds and place in escrow, obtain lands, easements and right-of-ways.
- Construct disposal site.
- Complete dredging, dewatering and disposal of contaminated sediments by 2005.
- Review post-cleanup monitoring and determine the need for any additional remedial actions.

The Cuyahoga River Remedial Action Plan

“Our vision as we enter the 21st Century is to restore and protect the Cuyahoga River and nearshore area of Lake Erie as a natural resource which we can use, enjoy, and bequeath with pride as our heritage to our children and future generations.”

“Our mission, with the participation of the community, is to plan and promote the restoration and preservation of beneficial uses of the lower Cuyahoga River and nearshore area of Lake Erie through remediation of existing conditions and prevention of further pollution and degradation.”

History

The 33-member Cuyahoga River RAP Coordinating Committee (CCC), representing multiple sectors, was appointed by Ohio EPA in 1988. The non-profit Cuyahoga River Community Planning Organization (CRCPO) was formed to receive funds and provide local staff to support RAP activities. The 1992 Stage 1 Report identified 10 of 14 beneficial use impairments in the AOC. The Stage 1 Report was updated in 1995, followed by the Early Implementation Report in 1996 that documented activities underway that addressed the identified use impairments.

The RAP worked with Ohio EPA to develop navigation channel water quality standards, resulting in their promulgation without litigation. The RAP is cited in the regulations as the responsible party for evaluating reaeration technology and cost feasibility as the first phase of a TMDL for the navigation channel. Feasibility and technology studies have been completed with additional work underway concerning habitat and environmental benefit. Many partnerships have been formed to assist in realizing the goals of RAP partners, and have supported the many studies necessary to better understand the river. Fish tissue monitoring conducted by the RAP led to the issuance of a fish consumption advisory in 1994. The RAP promoted use of soil bioengineering techniques for streambank restoration, held several workshops and completed construction at six sites in the AOC. The RAP spearheaded a nomination effort that resulted in the 1998 designation of the Cuyahoga River watershed as an American Heritage River. This will allow more focus on economic and social issues in addition to the environmental focus of the RAP. A five-year strategic plan was adopted in early 1999 to guide future CCC activities.

The Cuyahoga River RAP is recognized as an international leader in the RAP community; members have received numerous awards for their partnership and stewardship efforts and have given many presentations on the institutionalization of the RAP process.

Projects Underway

- Active public involvement, outreach and education program.
- Big Creek and Yellow Creek Stream Stewardship programs providing coordinated cleanup, restoration and protection activities at the smaller watershed/community level.
- Multi-year larval fish survey of navigation channel and lower river.
- Investigations into the need for and financing of a debris harvester for lower river and harbor.
- Urban streams program initiated in 1998 to focus on stewardship of small urban streams.
- Participation in preparation of updated 208 plan for NE Ohio.
- Organization and implementation of American Heritage River program.
- Committees established to carry out various initiatives listed in the 1999 Strategic Plan.

Projects Pending

- Negotiations underway with USACE for the preparation of a navigation channel habitat restoration feasibility study and the potential construction of demonstration project(s).
- Preparation of Stage 1 Update.
- Preparation of Action Agenda/Stage 2 Report.
- Expansion of stream stewardship program into other subbasins of the Cuyahoga River.

- Purchase and maintenance of debris harvester for cleanup of floating river debris.
- Identification of fish anomaly (DELT) hotspots and tumor surveys.
- Study of potential sources of *Giardia* and *Cryptosporidium* to area.

Gaps and “To Be Done”

- Bird and wildlife deformity/reproduction studies.
- Input into the development of the lower Cuyahoga River TMDL to be done in 2002.
- Additional focus on potential human health concerns as connected to environmental conditions.
- Additional work on reducing/eliminating combined and separate/sanitary sewer overflows (CSOs and SSOs).
- Remediation of dissolved oxygen problems in the navigation channel.
- Implementation of additional programs to reduce sediment loads to the river.
- Considerable habitat and wetland restoration and rehabilitation is still needed.

Black River Remedial Action Plan

History

The Black River RAP process began in 1991 with the establishment of the Black River RAP Coordinating Committee. Several major remedial actions had occurred on the river prior to the initiation of the RAP process, particularly in regard to point source dischargers, but much still needed to be done. The entire watershed was designated as the area of concern. The 1994 Stage 1 Report documented 10 of 14 beneficial uses as impaired, with nonpoint source runoff identified as the main cause of impairments in all but the lower section of the mainstem, where point sources also still significantly impact the river. The 1999 Ohio EPA basin survey report revealed environmental improvement compared to the 1994 report, but the improvements were not as dramatic as those seen between the 1994 and 1987 reports. This is most likely a reflection of when point source controls were implemented. A USS/Kobe dredging of PAH-contaminated sediments, implemented under enforcement action, resulted in dramatic lowering of the incidence of cancer in brown bullhead by 1998. The RAP adopted a Riparian Corridor Resolution in 1996 that outlined the need for riparian corridor establishment and protection. A Strategic Long Range Plan completed in 1997 outlined RAP direction for the next several years. A symposium titled “Protecting What’s Been Gained in the Black River” held with IJC Water Quality Board in 1998 celebrated accomplishments and hardened the resolve to do more.

Projects Underway

- A model zoning ordinance to encourage environmentally friendly development in wake of urban sprawl pressures from Cuyahoga County is being developed for Carlisle Township. It is to be used as a model for other townships throughout the county.
- ODNR Urban Stream Specialist program added a new RAP member to help improve, restore, and protect urban waterways and to create self-sustaining local watershed groups.
- The citizen-popular Constructed Wetlands program for home sewage disposal systems (HSDS), begun in 1993, is still being evaluated for the most efficient flora-types for this region.
- Watershed Education Projects (many).
- Volunteer Monitoring provides tracking of water quality and stream stewardship.
- Annual Great Blue Heron Rookery Survey is showing great success in restoring habitat.
- 319 Upper Black River Watershed Project is addressing agricultural runoff and HSDS failure.

Projects Pending

- Grove Site Project and Cromwell Park Site Project are two exciting Lorain riverfront brownfield DOD development projects. These projects have the potential for significant river enhancement.
- Countywide Urban Sediment Control - RAP involved program addressing NPS control.
- Black River Study Team to re-evaluate use impairments of the 1994 Stage 1 Report.
- Comprehensive modeling of the Black River lacustrary (lake/rivermouth zone).
- Outcome of 319 project - mountains of data, how to manage, analyze and identify next steps.
- Western Lake Erie Basin Watershed Initiative/Conservation Reserve Enhancement Program.
- Ohio Lake Erie Buffer Initiative to add 600-700 acres of riparian buffers in watershed.

Gaps and “To Be Done”

- The nonpoint sources identified as the major causes of impairment are not easily alleviated by conventional means: 1) Urban and Suburban Storm Water Runoff; 2) Animal Feedlot Runoff; 3) Combined and Separate Sewer Overflows; 4) Home Septic System Malfunctions; 5) Agricultural Sediment Runoff; and 6) Construction Site Runoff.
- Denitrification and depleted DO levels remain major problems, especially in the shipping channel. These problems are due in part to 1) deep ship channel; 2) nutrient loading from Elyria, French Creek and Lorain WWTPs; 3) thermal pollution from steel industry; and 4) heavy sediment loads from the upper watershed. The RAP is negotiating with the dischargers, all RAP members, to develop a comprehensive model to define the problems and causes in this portion of the river.
- Linking results of the 319 project to remedial actions needed, and other NPS programs.
- Storm water management must be watershed based and RAP partners are working on solutions.
- The greatest benefit to this troubled river would be enhanced, ensured, and protected riparian corridors. This can be done with the RAP, but not solely under the authority of the Ohio EPA.

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Maumee Remedial Action Plan

Mission Statement: *“The Maumee Remedial Action Plan is a community effort to restore the health and beauty of the Maumee River Ecosystem for the benefit of all who live here.”*

History

The RAP process began in 1987 and was organized under the Toledo Metropolitan Area Council of Governments with oversight by Ohio EPA. Over 100 stakeholders participated in preparation of the Stage 1 Report, which was completed in 1990. Ten of 14 beneficial uses were documented as impaired. A “Recommendations for Implementation Report” was completed in 1991 and identified five high priority areas: agricultural runoff; landfills and dumps; wetlands and open space; urban stormwater runoff; and community involvement. Action groups were formed to focus on each of these issues as well as overall support. Two action groups were formed to specifically focus on the myriad problems of the Ottawa River and Swan Creek. A \$3.5 million study (special line item federal budget appropriation) was completed to assess current conditions in the AOC and link waste sites to contamination in streams. Many programs have been initiated or supported to reduce agricultural runoff. Remedial actions at the Dura, Stickney, Tyler and King Road landfills have reduced significant loads of PCBs to the Ottawa River. Soil and sediment remediation at the Textileleather and Fraleigh Creek (formerly unnamed tributary) sites removed more than 57,000 lbs of PCBs from the Ottawa River. Many educational workshops have been conducted covering such topics as: agricultural runoff; urban runoff; pollution prevention; drinking water and pesticides; watershed planning; environmental risk, etc. A RAP Strategic Plan was completed in 1997.

Projects Underway

- A very active public outreach and education program.
- Establishment of watershed partnership to focus on the remediation of Duck and Otter Creeks.
- Swan Creek upper watershed Ohio Partnership for Urban Streams project.
- Development and implementation of Swan Creek Watershed Plan of Action.
- Economic and environmental benefits to dredging the Ottawa River study.
- Wetlands inventory project with USACE (Corps).
- StreamKeepers program on Swan Creek to monitor *E.coli* and fecal coliforms.
- Toledo Metropolitan Area Stormwater Utility Plan.
- Sediment distribution in lower Maumee and Ottawa rivers.
- Toledo Harbor Longterm Management Plan to address reduction and disposal of sediment in the Maumee River navigation channel.
- Ottawa River Remediation Team, a partnership of environmental professionals (including Ohio EPA), is working to expedite the restoration of the Ottawa River.
- Demonstration project on Ottawa River using AquaBlok for capping sediments.
- Streambank restoration using biotechniques on Swan Creek and the Toussaint River.
- Toussaint River 319 project to reduce agricultural sediment runoff.

Projects Pending

- North Cove Landfill remediation.
- Sediment sampling on Duck and Otter Creeks.
- Development of strategic plan for restoration of Duck and Otter Creeks.
- Sediment transport modeling in Maumee mainstem.
- Implementation of Conservation Reserve Enhancement Program in NW Ohio.
- Implementation of Ohio Buffer Initiative to increase buffer strips along streams in the Ohio Lake Erie basin.

Gaps and “To Be Done”

- Recreational channel dredging on Ottawa River. Need to address contaminated sediments and funding issues.
- Need strategy for further assessment and remediation of Duck and Otter Creeks.
- Identification of PCB sources in the Maumee River mainstem.
- Wetland and habitat restoration.
- Further reduction of sediment loads to the Maumee River basin.
- Continue implementation of Toledo metropolitan area upgrades to CSO and SSO overflows.

River Raisin Remedial Action Plan

History

The River Raisin Area of Concern (AOC) is located in Monroe County, Michigan. The AOC includes the lower 2.6 miles of the River Raisin from the low head dam (Dam #6) at Winchester Bridge in the City of Monroe and extends 1/2 mile out into Lake Erie, following the federal navigation channel. It also includes the nearshore zone of Lake Erie, one mile north and south from the river mouth.

The Remedial Action Plan (RAP) process documented five of 14 beneficial uses as impaired: restrictions on fish and wildlife consumption; degradation of benthos; restrictions on dredging activities; degradation of aesthetics; and loss of fish and wildlife habitat. These impairments are caused primarily by historical discharges of oils and grease, heavy metals, and polychlorinated biphenyls (PCBs) to the river from industrial facilities in the area. Additionally, industrial and municipal waste disposal sites adjacent to the river are suspected of contaminating river water and sediments with PCBs and heavy metals and have also resulted in a loss of fish and wildlife habitat.

Project Milestones

- 1987: The River Raisin Remedial Action Plan was reviewed and completed;
- 1988/89: Michigan Department of Natural Resources sampling of the river showed that the area most impacted by PCB and heavy metal contamination was from the turning basin to the mouth.
- 1992: River Raisin Remedial Action Plan Team was formed. Membership consists of representatives from various federal, state and local agencies such as the Natural Resources Conservation, MDEQ, Michigan Department of Public Health, Monroe County Health Department and Monroe County Soil and Water Conservation District.
- 1993: The River Raisin Public Advisory Council was formed. Membership consists of citizens representing a wide range of interests such as the River Raisin Watershed Council, local government, businesses, industries, and environmental groups.
- 1997: Ford Motor Company completed an environmental dredging project in the river.

Projects Underway

- In addition to the work occurring within the River Raisin AOC, MDEQ is investigating several Environmental Response Act (Act 307) sites of contamination such as landfills and industrial sites that are adjacent to or near the river. These sites are possible sources of some of the contaminants that are present in the River Raisin AOC. Input of contaminants to the river from these sites may be occurring through overland runoff, wind blown contaminated soils, or groundwater discharges.

(Projects Pending)

(Gaps and “To Be Done”)

Appendix A

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Rouge River Remedial Action Plan

History

The oldest and most heavily populated and industrialized area in southeast Michigan is located within the Rouge River watershed which covers 1,210 km² in southeastern Michigan. The river has four main branches, totaling 125 miles of waterways, includes more than 400 lakes and ponds, and more than 50 miles of parkland along its banks. The river winds its way through 48 communities and provides recreational opportunities for more than 1.5 million people. The lower four miles of the river are maintained as a shipping channel from the turning basin to the river’s mouth at the south end of Zug Island.

The Remedial Action Plan (RAP) process documented five of 14 beneficial uses as impaired, including: restrictions on fish and wildlife consumption; degradation of fish and wildlife populations; fish tumors and other deformities; degradation of benthos; and restrictions on dredging activities. Combined sewer overflows (CSOs), urban storm water discharges, nonpoint source pollution, and municipal and industrial discharges all contribute to the use impairments.

Project milestones

- 1989: The Rouge River final working RAP was completed and adopted.
- 1992: An Annual Progress Report was completed.
- 1994: A Rouge River RAP Update was published.
- 1998: The Rouge River RAP Update, a biennial report on implementation of the Rouge River RAP, was published.

Projects Underway

The Rouge River RAP institutional framework for updating the RAP is being modified to better meet the needs for implementation and to insure accountability in the planning process. The institutional structure includes: MDEQ staff with responsibilities to update the RAP; a Rouge Program Office created for the Rouge River National Wet Weather Demonstration Project (NWWDP); technical advisory groups; a newly revised Rouge

River Steering Committee to oversee implementation activities with the Voluntary Stormwater Permit; and a Rouge RAP Advisory Council (RRAC) to advise the MDEQ and assist in updating and implementing the RAP. The RRAC includes representatives of industry, environmental interests, citizens, universities, the Natural Resource Conservation Service, local and county governments, and parks and health departments. MDEQ and its partners will be using a biennial progress report card as a mechanism to help celebrate implementation, make mid-course corrections, provide public accountability, and further develop the RAP.

Nearly all of the initial CSO control construction projects proposed in the 1994 RAP have been completed or are nearing completion. Many retention/treatment basins are now in the evaluation phase to determine their effectiveness during various rain events. In general, it appears that the basins are capturing 85% of previous CSO discharges. As a result of these efforts, odor and bacterial problems have been reduced.

University of Michigan researchers conducted a study of the fisheries potential of the river. The results show that the downstream, larger reaches of the Rouge River have the greatest potential for developing recreational sport fisheries. However, current fisheries in these areas are severely degraded by poor water quality. The recently augmented flow of the Lower Branch of the Rouge River has greatly enhanced its potential as a fishery. Researchers state that watershed-wide reductions in storm water runoff will likely be necessary to rehabilitate fish communities.

Projects Pending

Gaps and ATo Be Done

The relative importance of different sources of pollution has changed. Pollution caused by sanitary overflows and CSOs has been significantly reduced, while other sources of pollution (e.g. urban storm water runoff, illegal connections, failing septic systems, flow, habitat loss) are becoming a higher priority. Subwatershed Advisory Groups have been formed to address local issues relating to storm water, flow management, habitat, and other locally identified issues.

The foundation of the revised RAP will be the watershed management plans being developed by the storm water advisory groups.

Key issues still needing to be adequately addressed include the pressures of ever-increasing urbanization, which destroys habitat and decreases fish, wildlife, and other aquatic populations. Critical habitat needs to be preserved and development needs to be done in an environmentally sensitive manner.

Detroit River Remedial Action Plan

History

The Detroit River is a 32 mile (51 kilometre) long channel linking Lake St. Clair and the upper Great Lakes to Lake Erie. The Detroit River Area of Concern (AOC) includes the areas which drain directly to the river and the drainage area of its tributaries in Michigan and Ontario (700 square miles), as well as the City of Detroit “sewershed” area of 107 square miles. It is a binational AOC. Approximately 75 percent of the total land area of the watershed is in Michigan (607.7 square miles).

The 1996 RAP document listed nine impaired beneficial uses. The 2000 Detroit River Canadian Cleanup Committee Report includes three additional impaired uses. Therefore, the RAP process to date has identified 12 beneficial uses as impaired: restrictions on fish consumption; tainting of fish flavor; degraded fish and wildlife populations; fish tumors or other deformities; bird or animal deformities or reproductive problems; degradation of benthos; restrictions on dredging activities; restrictions on drinking water consumption (taste and odour problems); beach closings; degradation of aesthetics; loss of fish and wildlife habitat; and exceedances of water quality standard objectives. The 1991 RAP Stage 1 Report outlined the following causes for these impairments: contaminated sediments; point and nonpoint sources; combined sewer overflows (CSOs); and, habitat loss and degradation. The report notes additional environmental concerns including: the introduction of exotic species; changes in fish community structure; and reductions in wildlife populations (primarily due to the loss of habitat).

In January 1998, Environment Canada sponsored a workshop that brought interested individuals and organizations from the Canadian side of the Detroit River together to re-establish a working group for Detroit River issues. The workshop resulted in the formation of the Detroit River Canadian Cleanup Committee (DRCC). Canadian pollutant sources account for approximately 10 percent of the total annual load in contaminants to the Detroit River. Estimates for progress on the Canadian side are that 60 percent of the required actions have been implemented. After a year of effort between U.S. EPA, MDEQ and local stakeholders, in June 1999, the U.S. announced its new structure for addressing the 1996 report recommendations. Both Canadian and U.S. organizations have been very active and are continually working on ties with each other toward an overall ecosystem approach. Each group is coordinating numerous RAP implementation projects.

Project Milestones

- 1991: Stage 1 RAP forwarded to IJC.
- 1992: Water use goals endorsed.
- 1996: RAP Report forwarded to IJC.
- 1998: Four Agency Letter of Commitment signed.
- 1998: The Detroit River Canadian Cleanup Committee established.
- 1999: U.S. Implementation Committee begins.
- 2000: Release of RAP Update Documents: 1) Canadian Detroit River Update Report prepared by the DRCC; and 2) binational progress report prepared by U.S. EPA.

Projects Underway

Remediation and Research

- Black Lagoon Sediment Remediation (US)
- US Army Corps Environmental Reconnaissance Survey (US)
- Windsor Riverfront Pollution Control Planning Study provides an implementation strategy for CSO control and reducing pollutant loadings to meet RAP objectives (CAN)
- Data Management and Modeling Framework for the Detroit River which will: describe the current environmental health of the river; document significant changes of contaminant inputs over time; quantify the linkage between inputs and impairment of the natural environment; quantify Canadian contaminant loadings; determine the location and extent of contaminated sediments in Canadian waters; and help to assess the need for sediment remediation in Canadian waters (CAN)
- Detroit River bathymetry study (US)

Habitat

- Survey of candidate sites on the Detroit River for potential habitat rehabilitation/enhancement (US)
- Support of American Heritage Rivers Soft Shoreline Engineering Initiative, specifically development of Best Practices Manual (US)
- Biodiversity Conservation Strategy implementation identifies priority habitat restoration sites and includes the development and implementation of restoration plans (CAN)

Human Health

- Profile of fishing and fish consumption in the Detroit River Area (CAN)

Pollution Prevention and Nonpoint Source

- Promote pollution prevention outreach within metal finishing sector (US)
- Provide recommendations for water use/reuse opportunities in non-contact cooling water applications (US)
- Initiating a pollution prevention program for marinas (US)
- Remediation is continuing to address rural non-point source pollution entering the Detroit River watersheds of Canard River, Turkey Creek, and Little River (CAN)

Education/Outreach/Stewardship Sustainability

- Urban Group Session (US)
- Detroit Boat Show display and survey (US)

Projects Pending*Remediation*

- \$184 million in Windsor CSO control and an upgrade to secondary treatment at the WWTP (CAN)
- Grassy Island National Wildlife Refuge (US)

Habitat

- US Army Corps of Engineers 206 Study for Hennipen Marsh (US)
- Detroit River sturgeon study (US)
- Biodiversity atlas (US)
- Detroit River ecological risk assessment (US)

Human Health

- Detroit urban fisheaters study (US)

Pollution Prevention and Nonpoint Source

- Expand PCB minimization program (US)
- Expand hospital mercury reduction project to other medical/clinical facilities (US)

Education/Outreach/Stewardship Sustainability

- Detroit River framework to implement the Detroit River RAP (US)
- Development of Environmental Justice strategy (US)
- Detroit River reconnaissance survey outreach meeting (US)

Gaps and “To Be Done”

- Detroit River GIS and outreach mapping project (US)
- Contaminant survey (US)
- Binational monitoring strategy
- Binational delisting criteria

Wheatley Harbor Remedial Action Plan

History

The boundaries of the Wheatley Harbour Area of Concern (AOC) include the harbor and Muddy Creek watershed (ca. 10 km²).

The RAP process identified four of 14 beneficial uses as impaired including: restrictions on dredging activities; eutrophication or undesirable algae; degradation of fish and wildlife populations; and loss of fish and wildlife habitat. These use impairments are caused by contaminants in sediments, high phosphorus concentrations, reduced water clarity, bacterial contamination, and habitat loss. PCBs in the sediments have been tracked to historical fish processing operations. PCBs are concentrated in the fatty organs and tissue of fish not consumed by humans and removed in the processing of the fish fillet. These processing wastes were historically discharged directly back to the harbour. As a result of this practice, PCBs concentrated in the sediments.

Project milestones to date include:

- 1970s: Wheatley Harbour was designated as an AOC due to dissolved oxygen depletion, elevated bacteria counts, nutrient enrichment and PCB contaminated sediments.
- Omstead Foods, the largest fish and vegetable processor, installed an advanced wastewater treatment system. The remaining processing facilities and the residential area on the east side of the harbor are now served by a municipal sewage treatment plant that discharges directly to Lake Erie.
- Combined Stage 1/Stage 2 Report was submitted to the IJC.
- Laboratory bioassays and field based assessments of *Cladophora*, mussels, benthos, fish, and tree swallows, indicate that sediments now have a low degree of biological effect and organic chemical bioavailability.
- 1998: Major sampling effort was undertaken including water bacteriology, water toxicity, sediment chemistry, sediment toxicity and benthic macroinvertebrate studies.

Appendix A

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Projects Underway

- reducing nonpoint sources of phosphorus discharge into Muddy Creek;
- improving water clarity in the harbor;
- eliminating malfunctioning septic tanks as the source of bacterial contamination in the harbor and area beaches;
- preserving and rehabilitating wetland areas along Muddy Creek.

Projects Pending

- The 1998 sampling data needs to be used to determine if the Wheatley Harbor AOC meets the water use goals defined by local residents. If so, the AOC can be delisted.

Gaps and “To Be Done”

- Long-term monitoring to insure that the water use goals continue to be met must be implemented.

Clinton River Remedial Action Plan

History

The Area of Concern (AOC) includes the entire Clinton River watershed (1,968 km²/760 square miles), located just north of Detroit, and flowing 80 miles (128 km) from its headwaters to Lake St. Clair near the city of Mt. Clemens. About half of the river's flow is treated wastewater from six municipal wastewater treatment plants. Land use on the north branch of the river is agricultural. The main industries in the area are automotive-related. Through the RAP process, eight of 14 beneficial uses are identified as impaired including: restrictions on fish and wildlife consumption; degradation of fish and wildlife populations; degradation of benthos; restrictions on dredging activities; eutrophication or undesirable algae; beach closings; degradation of aesthetics; and loss of fish and wildlife habitat.

Project Milestones

- 1988: The initial Clinton River RAP document was completed.
- 1995: Second iteration of the Clinton River RAP document was completed.
- 1998: Clinton River RAP Update Report reviewed and completed.
- Two years of sediment sampling to locate areas of contamination outside the lower river.
- Macomb County special prosecutor for water quality hired.
- Enforcement actions taken on failing septic systems, illegal connections, wetlands violations, etc.
- Aquatic habitat survey completed.
- Storm water management guides developed for local governments and site development.

Appendix A

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Projects Underway

- Control of CSOs addressed with new permits, construction of required improvements underway
- Sanitary sewer overflows have been recognized and corrections are underway.
- Field work to discover and correct illegal connections underway.
- Wetlands functional assessments completed.
- Subwatershed management planning for wetlands protection and storm water management.
- NPS control plan completed for urban subwatershed (Bear Creek), with implementation underway.
- Options for improved operation and management of onsite sewage systems identified and are being implemented.
- Volunteer stream monitoring program for schools.
- Public education and outreach with newsletters, forums, workshops, public events, etc.
- Oakland County established infrastructure fund to financially assist municipalities with pollution control efforts.

(Projects Pending)

Gaps and "To Be Done"

- Solutions to many of the most serious problems (i.e. stormwater management plans, habitat protection) in the Clinton River Watershed require implementation at the local level through mechanisms such as land use planning. Because the watershed encompasses over 50 local units of government, comprehensive and coordinated efforts will be difficult.

St. Clair River Remedial Action Plan

History

The St. Clair River is part of the boundary between the United States and Canada, and flows southward about 40 miles (64 km) connecting the southern tip of Lake Huron to Lake St. Clair. The St. Clair River branches into several channels near its mouth at Lake St. Clair, creating a broad delta region including wetlands from St. Johns Marsh on the west (near Anchor Bay) to the north shore of Mitchell's Bay in Ontario.

The RAP process originally identified seven of 14 beneficial uses as impaired including: restrictions on fish & wildlife consumption; bird or animal deformities or reproductive problems; degradation of benthos; restrictions on dredging activities; beach closings; degradation of aesthetics; and loss of fish & wildlife habitat. Agricultural and industrial (in Port Huron and Sarnia) land use are the predominant causes of these impairments.

Project Milestones

- 1992: Stage 1 Report and Public Use Goals submitted to IJC.
- 1993: Stage 1 Update describing remedial options produced.
- 1994: Preferred options were identified and draft implementation plans were produced.
- 1995: Stage 2 RAP Recommended Plan was formally presented to provincial, federal and state representatives.
- 1997: RAP Stage 1 Update Implementation Annex.
- 1998: Stage 1 Update/Stage 2 Implementation Annex submitted to the governments stating that tainting of fish and wildlife flavor, restrictions on drinking water consumption or taste and odor problems, and added cost to agriculture or industry, are "not impaired." Draft binational Habitat Management Plan submitted for review.

Appendix A

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Projects Underway

- Specific activities to address data gaps in the 1995 sediment characterization study are ongoing.
- A model is being used to evaluate sediment dynamics and contaminant transport over a period of more than 10 years given different remediation scenarios (no action-natural recovery, dredging, and capping).
- An environmental risk assessment, toxicity identification evaluation, establishment of reference condition, investigation of fathead minnow toxicity when exposed to aquatic sediments, and data comparison to Great Lakes benthic reference data base are all underway to provide the specific data needed to provide the rationale for remediation.

Projects Pending

- Removal or capping of a less than 2 hectare zone of contaminated sediments which is expected to remove or isolate 85% of the sediment bound contaminants in the area.

(Gaps and "To Be Done")

Lake St. Clair

Although Lake St. Clair is not designated an Area of Concern (AOC) under the Great Lakes Water Quality Agreement, two rivers that discharge into the lake are AOCs. These are the binational St. Clair River and the Clinton River in Michigan. Also, Lake St. Clair discharges directly into the Detroit River, also a binational AOC, which then empties into Lake Erie. Lake St. Clair is a highly utilized recreational lake that has been affected by numerous environmental insults in recent years. On the U.S. side the problems have been exacerbated by the impacts of urban sprawl, increased density of development and suburbanization in the surrounding area. On the Canadian side the problems are due more to agricultural land use in the watershed and the highly industrial area located upstream in Sarnia, Ontario. The lake's ecology has also been drastically altered and influenced by the invasion of exotic species such as the zebra mussel.

Environmental problems include: high levels of bacteria from combined sewer overflows and failing septic systems leading to beach closures and human health issues; chemical contamination of water and sediments including persistent bioaccumulative toxics; loss of fish and wildlife habitat; economic impacts on property values and businesses; and a decrease in the overall recreational quality of the lake. These problems have long been an issue with the various government agencies, stakeholders and the public.

The *Macomb County Blue Ribbon Commission Report on Lake St. Clair* in 1997 provided an impetus to gather a broad array of stakeholders into the debate. In January 1998, U.S. EPA staff met with members of the Commission to discuss the findings and recommendations of the report. One of the Commission's key recommendations to U.S. EPA was that it could play a pivotal role in facilitating a dialogue not only with local governments and stakeholders (which they had been very successful in doing) but also with other U.S. state and federal agencies and the Canadian and Tribal governments.

In May 1998, U.S. EPA hosted an information sharing meeting with the Blue Ribbon Commission and the four governments - two federal, state and provincial. At that meeting it was decided that a larger scale conference to help determine the state of the lake would be beneficial in providing an opportunity to share scientific data and research and in identifying opportunities for future collaboration. U.S. EPA, Region 5 took the initial lead to develop and implement such a conference. A stakeholder group was formed to assist in the planning of the conference. The group included the four governments, Walpole Island First Nation, local governments, environmental organizations and industry.

The conference was held in late 1999 and was attended by more than 230 people from Canadian and U.S. environmental agencies, watershed groups, local governments, First Nations, industry and academia. Information was exchanged about the state of Lake St. Clair, its problems, and responsibilities for future management of the lake's resources. The conference was funded by the U.S. EPA Great Lakes National Program Office along with several dozen other sponsoring organizations and facilitated by the Great Lakes Commission.

Topics covered included: 1) habitat and biodiversity; 2) human health, beach closures and drinking water; 3) loadings, toxics, transport and sources and; 4) physical conditions and processes. The numerous speakers represented a range of perspectives on each topic. The breakout sessions on the second day solicited many innovative suggestions and ideas for future actions and opportunities for collaboration. The conference achieved its goals of allowing an exchange of current information; a review of programs, policies and institutions responsible for managing the lake and; identifying opportunities for future actions and collaboration. The conference proceedings were issued in January 2000 by the Great Lakes Commission.

Since the conference, the following commitments have been made to address Lake St. Clair:

- The four government parties (EPA, MDEQ, OME and EC) have agreed to include the lake in the "Four Party Letter of Agreement" that, up to this time, covered only the binational Areas of Concern.

- GLNPO has committed funding to host a biannual Lake St. Clair Conference. WD has committed funding for an outside facilitator to help develop a management framework for the various stakeholders.
- Lake St. Clair will be given a spot on the agenda at the Binational State of the Lakes Ecosystem Conference (SOLEC) in October 2000 along with the five Great Lakes.